Pheasant H-10 Biplane

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TAMING THE TAILDRAGGER PILOT

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There is a popular misconception which states tailwheel airplanes are so grossly unstable directionally it takes a superpilot to fly them. Has anyone taken notice this line of thinking didn't exist when there was nothing but tailwheel airplanes out there? That's just the way an airplane was so you went out and flew it. The concept of one airplane being harder to handle on the ground than the other only came about when the nosewheel made it so easy to fly that people found they could snooze more on the ground than they could in the past.

What we are saying is tailwheel airplanes are not difficult to fly, it's just that nosewheel airplanes are so incredibly easy to fly pilots have come to think of their feet as nothing more than a convenient place to store socks

Hence the title, "Taming the Taildragger Pilot". There are very few tailwheel airplanes out there that are so basically wild they need taming. There are, however, lots of pilots who could benefit from a little refining. In almost all instances where an airplane has a reputation for eating a pilot's lunch on the ground, it is usually a problem with the pilot, not with the airplane.

As Curtis Pitts said last year at Oshkosh, "There are no squirrely airplanes, just squirrely pilots."

For just a second let's talk about the geometry of landing gear and why one configuration is more difficult to handle than the other. If you have been through this explanation before, you can skip this paragraph. The rest of you take note of where the center of gravity is in relationship to the main gear on nosewheel and tailwheel airplanes. Obviously, the nosewheel airplane's CG is in front of the main gear while the tailwheel bird has it behind the main gear. So what happens when the airplane is moving in one direction, but the nose is pointed somewhere else? The CG will be off to one side of the intended path of travel. The center of gravity's inertia tries to carry it in a straight line, which on a nosewheel airplane tends to straighten it because the CG is in front of the pivot point represented by the main gear, so as it moves forward, the geometry combines with the inertia to pull the nose back towards the centerline.

On the tailwheel airplane, just the opposite is true: as the CG's inertia tries to pull it forward, it is carrying the tail, not the nose, with it. And the further that center of gravity gets off center, i.e., the more cocked the airplane gets to the line of travel, the more rapidly it wants to bring that tail around. From the pilot's point of view, movement of the tail is actually a swerve that starts to move at a slow rate. If he doesn't stop the movement immediately and push the CG back in line, that rate builds up with frightening rapidity.

So the non-tailwheel pilot may ask, "If the center of gravity keeps trying to pull the tail of the airplane around so it's running backwards, how can you say they aren't inherently difficult to fly?"

Keeping the center of gravity diagram in mind, it's easy enough to see that if the airplane is kept straight, i.e., the center of gravity stays in line with the direction of travel, the airplane will remain straight. Now granted, some airplanes will remain straight easier and by themselves while others take a little more attention from the pilot. And it is this attention from the pilot that gets them in trouble.

There has never been a more or less modern airplane (we are excluding World War I types, golden age antiques that are trying to fly on pavement and a few oddball airplanes) that ground looped or left the runway without some help from the pilot. This so-called "help" from the pilot takes the form of telling the airplane to do something that it shouldn't be doing, and this is normally in the form of overreaction to an initial swerve.

In the typical overreaction scenario, the airplane starts left (or right) and the pilot, rather than gently tapping it back into line, leaps on the right rudder and hauls the nose around trying to get it back in front of him, right now. In being in such a hurry to bring the nose back, he builds up a lot of turning inertia so the airplane continues past center and heads for the bushes on the right. The pilot sees it too late and, as the nose goes past center, leaps on the other rudder. He then chases his feet back and forth until the airplane either departs the runway or winds up doing the lowest level aerobatics possible.

Again - the name of the game is keep the center of gravity directly in line with the line of travel. All that takes in almost any airplane (almost) is a series of jabs left and right that are only used when the center of gravity, i.e., the nose, isn't where it should be.

Undoubtedly, the majority of trouble pilots initially have with tailwheels is a basic misunderstanding of the way the rudder/tailwheel works in the first place. There is a tendency for new tailwheel pilots to think when the nose starts moving you put the opposite rudder down until the nose is back where you want it and then the rudder is released. Wrong!

When a rudder pedal is depressed, it will start the nose moving with just a little lapse between applying the pressure and getting the movement. Then, once the nose is moving, it will continue moving whether the rudder is down or not. Therefore, the rudder is only used to initiate movements. It is not held in while the nose is making that turn. In fact, one of the best metaphors of how to use the rudders on a tailwheel airplane is to pretend you are taking a shower. You're going to turn on the hot water and the second you feel even the slightest amount of warmth, you're going to shut it off.

Applied to rudder pedal technique, that means you are going to put the rudder pedal down and, as soon as you see any movement at all in the direction of the foot that's down, you're going to get off of it immediately because the nose will continue moving in that direction.

If, after the nose starts moving, the rudder is kept down, the turn rate will continue to increase at an exponential rate. It only takes a fraction of a second of extra rudder for the nose to continue building up turn rate until it is in a full blown swerve which calls for an immediate bailout from the other foot. And so starts the tailwheel tango.

We'll repeat that . . . the correct method of using the rudder is to displace or tap it slightly. As soon as the nose starts moving in that direction, it's going to be neutralized and the other foot gets ready to jab rudder to stop the nose where you want it. So, you initiate the turn with a slight jab in one direction, stop it with a slight jab in the other direction. If at any time in that sequence the rudder pedal is pushed too far down or held for any length of time, the pilot can be guaranteed of a swerve in one direction or the other. You ought to treat the rudder pedals as if they are red hot. You're just going to hit them as long as you can stand the pain and get off of them immediately. Also, the duration of the jabs is in inverse proportion to the speed - the faster the airplane is moving, the less rudder pedal it takes to make things happen. When it's at taxi speeds, it may take lots of rudder and long duration to make it move around. This depends very much upon the airplane and how tight the tailwheel springs are.

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Remember - they are just little jabs, not big pushes!

That doesn't sound all that difficult, does it? Well, it's not if your eyes actually see what it is you're trying to accomplish. Unfortunately, the ability to see what is needed is the other major problem in handling a tailwheel airplane. Visual acuity, or the ability to see small changes, is almost always lacking in first time tailwheel pilots. Nosewheel airplanes don't require that kind of acuity because, as long as the airplane is approximately straight, it will straighten itself out and run true. On a tailwheel airplane, however, the degree of difficulty a pilot will have is directly proportional to his ability to see the tiniest movements of the nose and correct for them.

If on landing the nose gives a hint of moving to the left and he corrects it immediately with a tiny jab to the right, he'll have no trouble. However, the farther he lets that nose get off before he takes corrective action will increase the degree of difficulty he is going to have landing the airplane.

Remember the center of gravity? We want to keep it as close to center as possible. So the further it gets off, the harder it is going to be to get back.

The necessity of immediately seeing the nose move cannot be overstated. Tiny movements take tiny corrections; big movements take gigantic corrections!

Now let's talk about yet a third area of misunderstanding, and that is the tendency to want to bring the nose back to the center of the runway on the very first try. If the nose has been allowed to wander off to the left and the pilot leaps on the right rudder in an attempt to bring the nose back to the center of the runway, all on one big movement, he will build in a tremendous amount of inertia. The nose will be moving so fast and hard that it will automatically swerve right past the centerline before he has the chance to adequately stop it with the left rudder.

A far easier method to bring the nose back to the centerline is to first stop the nose in the direction it's heading, i.e., it has moved left, so the right rudder is jabbed just enough to stop it from moving any further left. Then the right rudder is jabbed again to bring the nose back parallel to the centerline so you aren't headed toward that bunch of freshly painted Lear Jets. At that point, if it's a wide runway and the pilot is content with less than perfect placement on it, the airplane will be already headed straight and he can go back to normal directional control duties.

If the runway is narrow or the pilot prides himself on his ability to keep an airplane in the middle of a runway, he has to poke just enough right rudder to get the nose moving back towards the centerline and then jab just a little left rudder when he gets there to bring it back parallel with the runway. As we have described the process, it is a series of loosely connected events but in reality, depending on the speed of the airplane, all of these flow together into one series of corrective actions. It's only in the slowest tailwheel airplanes (such as a Cub) that these events actually happen separately. In something like the Pitts they are crammed so tightly together, it's all but impossible to distinguish between them.

Whether Cub or Pitts, the concept remains the same - do not try to bring the nose back to the centerline with the first application of rudder. To do so means you just played the opening Chord on doing the two step tango again, because your right foot is going to wind up chasing your left foot and vice versa.

We hate to harp on this, but remember - first stop the nose in the direction it's headed, bring it parallel with the centerline, and then bring it back to the centerline if so desired. Each of these movements is done with quick little jabs of the rudder unless the nose is really going off in one direction or the other and then it's done with quick big jabs of the rudder.

Trying to teach (or learn) tailwheel footwork takes much longer if it is all done while shooting landings. On a landing everything happens a bit too fast to really soak up what's happening plus the student only gets to see it once on each approach. It's far better to start at one end of the runway and bring the power up just enough that the tail comes off the ground, and just drive back and forth from one end of the runway to the other, practicing what we have just been preaching. It's important, when doing this kind of penguin practice, to first make sure there is not much wind in either direction. Secondly, watch very carefully and separate the swerves which were caused by the airplane or environmental conditions from the swerves which were actually caused by the pilot. At first they'll blend together, but after a few runs, the student will begin to notice the vast majority of the airplane's meanderings were brought on by his own feet stomping either a little too hard or a little too long or both.

As a side note: Everything having to do with learning to fly a tailwheel airplane is made 100% easier if you can find a wide grass runway to do all initial work on. The grass grabs the tailwheel and slows it down just enough that it has a bit of tail skid effect and helps keep the tail behind you, therefore minimizing the amount of tap dancing that has to be done. Any tailwheel airplane is tons easier to handle on grass because everything it does is slowed down considerably.

Takeoff techniques vary considerably from airplane to airplane and from instructor to instructor. In general, however, the higher performance airplanes, i.e., the Pitts Specials and Mustangs, start the takeoff roll with the stick nailed to the pilot's belt buckle to maintain tailwheel steering until the airplane has a big enough head of steam that there is plenty of wind going across the rudder when the tail is raised.

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Slower speed airplanes, such as Cubs and Champs, often begin the takeoff roll with the stick hard against the firewall so the tail comes into the air as soon as it has enough speed. In either case, the pilot should recognize that raising the tail abruptly can cause an unwanted swerve to the left because of the gyroscopic procession of the propeller. If the tail is brought up slowly and smoothly even the high performance bird will track more or less straight with maybe a little bit of right rudder needed. However, hoist the tail into the air hard, fairly quickly, when the airplane is moving and the propeller precesses, causing the airplane to turn left. In some cases, this turn is so pronounced the pilot has to counteract with a foot full of right rudder. This is often mistaken for torque and there is a little torque involved in it but much more straight gyroscopic precession. This effect is much more noticeable with airplanes swinging heavy props with big engines.

Once the airplane is running on its main gear, everything is much easier because, first of all, the pilot can see what he is doing much more clearly because the nose is out of the way. Also, the input from the rudder is more positive and, at the same time, damped a little bit because it isn't being fed directly from the tailwheel to the ground. It's being fed from the rudder into the air and it moves more smoothly.

Although it's largely a matter of personal preference, most long time tailwheel pilots will pick the tail up just high enough that the airplane is a little short of level, while on the main gear. This maintains a positive angle of attack so the airplane will fly off the ground when it reaches a speed it is happy with. The alternate technique of keeping the tail high and thereby nailing the airplane to the ground and then forcibly rotating it off is viewed by many as being a bit crude or, at the very least, a little inharmonious. The medium we are moving through, i.e., the air, is smooth so why not treat the airplane the same way?

Once in the air, the fact that the airplane has a tailwheel on it makes little or no difference. It isn't until turning base leg to final and setting up for the approach that having the little wheel at the other end once again begins to become important.

The single most important thing about the approach for a tailwheel airplane is to do everything in your power to make sure it is absolutely straight on touchdown. A tailwheel airplane, almost regardless of type, will remain rolling straight for a period of time, if it touches down straight. However, if any of them touches down crossways then the pilot already has his work cut out for him.

Whether an airplane is landed on its main gear or three point it is often a source of some controversy, as well as a lot of personal taste. It is an absolute fact that some airplanes such as the Globe Swift require much more finesse to three-point than wheel land, which is why you almost always see them being driven on main gear first. The same thing holds true on aircraft such as Mustangs and T-6's as well, although both of those airplanes three-point very nicely, but again they require a little bit more finesse to make sure they are straight once they touch the ground.

Almost all light airplanes, with only a few exceptions, should be three pointed since, among other things, that puts them on the ground at their minimum speed. Speed on touch-down is important because it controls the severity of swerves. It seems as if swerves get worse on an exponential curve, as the speed goes up. Just about the only time a light aircraft should be wheel landed is when the gust spread is so high it's dangerous to attempt a full stall landing because a gust could drop you like a sack of potatoes. In that situation, the wheel landing allows you to maintain control right down to the runway and actually drive it on at a speed which is able to overcome the gusts.

There is no doubt that doing a good three-point in an airplane requires much more finesse than simply driving it down and nailing it on the mains. However, developing that finesse is what flying is all about. If you're not willing to learn to do it right, it might not be a bad idea to either go back to flying nosewheel airplanes or stick with golf.

In reality, with the exception of the last six inches of the flair, landing a tailwheel airplane is identical to landing a nosewheel airplane. The primary difference being, as the airplane runs out of speed, it is rotated into the three point position at exactly the same rate the speed bleeds off and settles on all three. Now, this sounds easy and in reality in some airplanes it is while in others it isn't. The actual degree of difficulty is based on how quickly the airplane is moving and how gusty the winds are. If the winds are beating you up, it's necessary to have a very firm hand on the airplane. When three-point attitude is reached, the pilot fixates on that attitude and through coordinated use of rudder and ailerons, overrules any attempts of the wind to change it.

As the airplane settles on the ground, certainly one of the most common tendencies of new tailwheel pilots is to look out one side of the airplane or the other. In fact, most pilots look out the left side. Unfortunately, that tends to bias their field of vision, making it difficult for them to judge quickly enough whether they are rolling straight or not. Again, depending on the airplane, one of the most useful techniques is to look straight ahead, picking up the sides of the runway in the peripheral vision, so both sides are actually being seen at one time. When this technique is used, any minor movement of the nose is greatly amplified visually and the pilot can react to it quicker. If he's only looking on one side, the nose has to move a little further for him to catch it, thereby making his life a little tougher for the short term.

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As the airplane is being flared and the closer it gets to the ground, the harder the pilot should fight to keep the wings level (unless there's a cross-wind, of course) and the nose directly in front of him. In actual fact he may be coordinated (rudder and aileron, etc.) until the last second and then it's forgivable if he has to kick just a little rudder to fine tune the nose just before it touches down.

After the airplane touches down, assuming it's straight and depending on the airplane and pilot, it may or may not roll straight ahead for an undetermined period of time. Something like a Cub or Citabria will track perfectly straight forever, if the pilot just does his part in keeping it straight on touch down. High performance airplanes like the Pitts Special will track straight ahead until they decelerate a little bit and then they tend to wander a little one way or the other. In either case, as the nose moves (or tries to move) the only corrective action should be the tiniest taps with the rudder. Those taps should continue until the airplane is absolutely dead stopped.

There have probably been more airplanes ground looped or run off the runway in the last 30% of the rollout where the airplane is slowing down than in the first part where it is much faster. Pilots have a tendency to think when the speed is all gone the airplane is totally tame, so they put their feet and their brains to sleep at the same time. In fact, a lot of neophyte ground loops occur at the very end of the landing rollout as the airplane turns off the runway onto the taxiway. The pilot forgets he's not flying a nosewheel airplane and simply does a little pirouette right at the taxiway throat.

Embarrassing.

There is a certain amount of elitism among taildragger pilots and it appears as if they look down on their nosewheel brethren as pilots of lesser stature. Depending on your point of view, that may or may not be true. However, what is absolutely true is anyone who has checked out in and is comfortable flying a tailwheel airplane will exhibit a much more precise manner of touch down and will see more of what is going on in the windshield (i.e., visual acuity) than will those who fly only nosewheel airplanes. This should not necessarily be the case since flying a 172 as well as it can be flown is every bit as difficult as flying a Pitts Special as well as it can be flown. The primary difference is the 172 doesn't demand it, so pilots often don't give it. While to be successful at all in a Pitts Special, you have to give it. You have no choice.

To many people, learning to fly a tailwheel airplane makes little or no sense since the tailwheel harkens back to a time somewhere back in the dark ages. If they don't see a reason for it, that's fine, no one is forcing it on them. However, if you don't fly a tailwheel airplane, there are a huge number of absolutely wonderful flying machines you will never get to know. A Staggerwing Beech will be forever beyond your grasp, as will the unbelievable performance of Pitts Specials and Sukhois and Extras. You'll never know the peculiar little whisper that comes from a Champ's landing gear as it brushes through the tops of the grass for an instant just before it touches down. You will, in point of fact, be shut out from the first half of general aviation's life and will miss some of aviation's most interesting flying machines. That is, however, a personal choice.

Besides, if you don't want to be a real pilot, that's O.K. No one will think less of you . . . maybe. ◆